



BOLETIM

MUSEU DE HISTÓRIA NATURAL DO FUNCHAL

Vol. LXX (2020), Art. 359: 27-33



ISSN 2183-279X (online edition) |

| Available online at: <http://boletim.cm-funchal.pt>

New record of an alien grass, *Ehrharta erecta* Lam. (Poaceae), for the Island of Madeira (Portugal)

By J. J. GONÇALVES SILVA ¹* & J. P. FERREIRA ¹

With 4 figures

¹ Museu de História Natural do Funchal, Rua da Mouraria, 31, 9004-546 Funchal, Madeira, Portugal.

* Corresponding author: juan.silva@cm-funchal.pt

ABSTRACT: The panic veldt grass, *Ehrharta erecta* Lam., is recorded herein for the first time from the island of Madeira. Several populations of this alien grass have been found in several localities of the island, indicating its naturalization. Once present in a region, *E. erecta* is able to spread relatively quickly because its seeds can be easily dispersed by wind or water over short distances, or by birds and human activities over longer distances. Its vector of introduction to the island of Madeira is unknown, since the plant is apparently not used as an ornamental species, in agriculture, or in the local ethnobotany. Given the locations where it was found, this neophyte was most likely, introduced accidentally as a soil contaminant in the pots of ornamental, exotic plants or mixed with forage plant seeds. In Madeira, *E. erecta* may become invasive in low altitude, natural habitats or in the surrounding areas, blocking natural processes of secondary ecological succession. Its potential for invasiveness must be monitored.

Keywords: *Ehrharta*, Poaceae, new record, naturalization, Madeira.

RESUMO: A gramínea, *Ehrharta erecta* Lam., é assinalada pela primeira vez para a ilha da Madeira. Foram encontradas várias populações desta erva alóctone em várias localidades do território insular indicando a sua naturalização. Uma vez presente numa região, *E. erecta* tem a capacidade de expandir a sua área de distribuição com relativa facilidade e rapidez, pois as suas sementes são dispersas a curtas distâncias pelo vento ou pela água e a longas distâncias pelas aves. Tanto quanto é do nosso conhecimento sobre esta espécie alienígena, desconhece-se o seu vetor de introdução na ilha da Madeira, visto que a planta, aparentemente, não é utilizada como espécie ornamental, agrícola, ou na etnobotânica local. De acordo com os locais onde foi encontrado, este neófito foi, provavelmente, introduzido acidentalmente através do solo de vasos de plantas ornamentais exóticas ou misturado com sementes de plantas forrageiras. Na Madeira, *E. erecta* pode tornar-se invasora nos habitats de baixa altitude ou nas áreas circundantes, bloqueando processos naturais de sucessão ecológica secundária. O seu potencial de invasão deverá ser monitorizado.

Palavras-chave: *Ehrharta*, Poaceae, novo registo, naturalização, Madeira.

INTRODUCTION

The archipelago of Madeira, located in the Northeast Atlantic, is situated approximately 900 km southwest of Europe (Lisbon, Portugal) and 630 km northwest of the West African coast (Casablanca, Morocco). It comprises the islands of Madeira, Porto Santo and the Desertas and together with the Selvagens, Canary Islands, Azores and Cape Verde archipelagos, makes up the biogeographical zone of Macaronesia. The Mediterranean climate of Madeira is deeply influenced by the northeast trade wind system, with weather conditions varying considerably between the south and north coasts and according to altitude. The island of Madeira, as many other oceanic islands, is very vulnerable to new introductions of alien species not only because of its climate, but also due to the high volume of traffic in people and goods that the island experiences annually.

According to JARDIM & SEQUEIRA (2008), the flora of Madeira comprises 1,226 vascular plant *taxa* (species and subspecies), 29 (2.4%) of which are 'possible introduced' and 401 (33.3%) 'introduced'.

With this new record, the grass family (Poaceae) on the archipelago of Madeira totals 139 native and introduced *taxa* (COPE, 1994; JARDIM & SEQUEIRA, 2008; CABRAL *et al.*, 2020).

Ehrharta Thunb., is a grass genus with approximately 35 species (CALVO & MOREIRA-MUÑOZ, 2018), native on Eastern and Southern Africa, including the southern part of Central Africa, as well as Yemen and Saudi Arabia, New Guinea and several islands of the Indo-Pacific and Tasmania (POWO, 2019).

In the Euro-Mediterranean area four species from this genus are recorded: *Ehrharta calycina* Sm. (Spain and Tunisia), *Ehrharta delicatula* Stapf (Italy), *Ehrharta*

erecta Lam. (France, Israel, Israel-Jordan, Italy, Morocco, Netherlands, Portugal, Sardinia and Spain) and *Ehrharta longiflora* Sm., Canary Islands (Gran Canaria), Spain and Madeira Island (VALDÉS & SCHOLZ, 2009; CABRAL *et al.*, 2020).

In mainland Portugal, MENEZES DE SEQUEIRA *et al.* (2011) recognize one *taxon* belonging to this genus, *E. calycina* Sm., occurring as introduced. GARCIA (1946), however, first recorded *E. erecta* Lam. (panic veldt grass) as subsynchronous, based on specimens collected around Coimbra area, in mainland Portugal, and ALMEIDA (2002) states that this species continues to be found frequently in this locality. VERLOOVE & GULLÓN (2012) also found *E. erecta* Lam., growing in the Algarve (Cacela Velha), Southern Portugal, in 2010.

Regarding the Macaronesian archipelagos, only *E. longiflora* Sm. is reported; it was recorded for the first time from Gran Canaria (Canary Islands, Spain) as an escapee from cultivation (KUNKEL, 1978) and, more recently, from the Island of Madeira, as a probable escapee from forage cultivation, since it was found fully naturalized near an agricultural field in the municipality of Calheta (on the south west of the island) (CABRAL *et al.*, 2020). *Ehrharta erecta* is not reported to Macaronesia (PALHINHA, 1966; SÁNCHEZ-PINTO *et al.*, 2005; SCHÄFER, 2005; ACEBES GINOVÉS *et al.*, 2010; SILVA *et al.*, 2010).

Until now, *E. erecta* Lam. has not been reported on the island of Madeira (LOWE, 1831, 1856, 1864; MENEZES, 1894, 1899, 1905, 1914, 1926a, 1926b, 1927; HANSEN, 1968, 1969, 1970, 1971, 1973, 1974, 1978, 1987, 1992; ERIKSSON *et al.*, 1979; HANSEN & SUNDING, 1993; COPE, 1994; VIEIRA, 2002; QUINTAL, 2007; JARDIM & SEQUEIRA, 2008; CABRAL *et al.*, 2020) and is recorded here for the first time from this island.

MATERIAL AND METHODS

The specimens of *Ehrharta erecta* Lam., reported herein, were identified according to KELLOG (2015) and (SMITH JR., 2012a, b), and are deposited in the Herbarium of the Funchal Natural History Museum (MADM). Coordinates were obtained using Garmin GPSMAP 78 series GPS and plotted on Google Earth (Fig. 1).



Fig. 1 – Geographical locations where *Ehrharta erecta* Lam. was collected on the island of Madeira.

Material examined

Ehrharta erecta Lam., Encycl. 2: 347 (1786)
(Fig. 2 – A, B, C).

Portugal, Madeira:

On an abandoned vineyard, Serrado, Porto da Cruz, Machico, 10.VII.2019, João Ferreira *leg.*, 32° 45' 32.0" N, 16° 49' 44.6" W, 174 m *a.s.l.* (MADM 7106);

On a garden in front of the main entrance of Pestana Promenade Hotel, São Martinho, Funchal, 12.VII.2019, João Ferreira *leg.*, 32° 38' 15.2" N, 16° 56' 12.3" W, 25 m *a.s.l.* (MADM 7020);

On the west sidewalk at the International Airport of Madeira, Santa Cruz, 17.VII.2019, Juan Silva *leg.*, 339 m *a.s.l.* (MADM 7095);

On an abandoned agriculture terrace, Maroços, Machico, 31.VII.2019, João Ferreira & Juan Silva *leg.*, 32° 44' 09.9" N, 16° 47' 47.6" W, 165 m *a.s.l.* (MADM 7125);

On an abandoned garden, near Snack Bar "As Pedras", Ponta Delgada, São Vicente, 31.VII.2019, João Ferreira *leg.*, 32° 49' 08.0" N, 16° 59' 26.7" W, 210 m *a.s.l.* (MADM 7111).

General description

The description of *E. erecta* found in Madeira, follows that given in GrassBase – The Online World Grass Flora as detailed below (CLAYTON *et al.*, 2002 onwards):

Habit: perennial; caespitose. Culms decumbent; 40-100 cm long; 4-6 -noded; rooting from lower nodes. Leaf-sheath auricles falcate. Ligule an eciliate membrane; 2-7 mm long; entire, or lacerate; truncate, or obtuse. Leaf-blades 4-20 cm long; 2-10(-15) mm wide. **Inflorescences:** an opened, or contracted panicle; linear, or elliptic; equilateral, or nodding; 6-20 cm long. Primary panicle branches appressed, or ascending; 1-3 -nate; simple. Panicle branches stiff; smooth, or scaberulous. Spikelets solitary. Fertile spikelets pedicelled. Pedicels filiform; 2-10 mm long. **Spikelets:** comprising 2 basal sterile florets; 1 fertile floret; without rhachilla extension. Spikelets oblong; laterally compressed; (3-)4-5.75(-6.8) mm long; breaking up at maturity; disarticulating below each fertile floret. Floret callus glabrous, or pubescent. **Glumes:** persistent; similar; shorter than spikelet; thinner than fertile lemma. Lower glume ovate; 3-3.6 mm long; 0.8 length of upper glume; membranous; 1-keeled; 3(-5) -veined. Lower glume apex obtuse, or acute. Upper glume ovate; 2.5-4.5 mm long; 0.8 length of adjacent fertile lemma; membranous; without keels; 5 -veined. Upper glume apex emarginate, or acute. **Florets:** Basal sterile florets similar; barren; without significant palea; attached to and deciduous with the fertile. Lemma of lower sterile floret elliptic; 5.4 mm long; coriaceous; 1-keeled; 5 -veined; smooth, or rugose; rough above; glabrous, or hispidulous; obtuse. Lemma of upper sterile floret elliptic; basally auriculate; 6.5 mm long; 1.2 length of lower sterile floret; coriaceous; smooth, or rugose above; obtuse, or acute. Fertile lemma ovate; 2.5-5.5 mm long; coriaceous; keeled; 5 -veined. Lemma midvein scaberulous. Lemma lateral veins with cross-veins. Lemma apex obtuse. Palea 2 -veined. Palea keels approximate; scaberulous. **Flowers:** Lodicules 2; obovate; membranous; 2-toothed; obtuse. Anthers 6; 1.5-2 mm long. **Flowering time:** I-VIII (ALMEIDA, 2002). **Chromosomes:** 2n=24 (SMITH JR., 2012b).

Key for the *Ehrharta* species occurring in the Island of Madeira (adapted from SMITH JR., 2012a):

1. Sterile lemma awns 0; stamens 6 ----- *E. erecta*
Sterile lemma awns 2–20 mm; stamens 3 -----
----- *E. longiflora*



Fig. 2 – *Ehrharta erecta* Lam.: A) general aspect; B) close-up of the inflorescence; C) florets.

CONCLUSION

In its native range, *E. erecta* Lam. is found in a great variety of habitats, including shady forest, open areas, disturbed areas and sand dunes (RAY *et al.*, 2018). Once present in a region, *E. erecta* is able to spread quickly, because seeds can be easily dispersed for short distances by wind or water and for longer distance by birds (OGLE, 1988) and by human activity (*e.g.*, gardening equipment or clothing). The seeds of panic veldt grass may also be carried as contaminants in potted plants (GLUESENKAMP, 2004) and may be introduced to new regions via imported garden soil and in birdseed (MCINTYRE & LADIGES, 1985; OGLE, 1988). *E. erecta* has the potential to swamp lower growing native species in invaded habitats, as well as increasing the fire risk and adding to the accumulation of organic matter. Rapid spread within a region is possible because formation of seed occurs rapidly, within several weeks of flowering and its germination rates are high, recorded as 99% within 11 months in Australia (MCINTYRE & LADIGES, 1985) where this grass species is widely naturalized. According to OGLE (1988), the capacity of panic veldt grass to flower and to produce copious seeds, if soil moisture conditions are adequate, together with the capacity to reproduce vegetatively by rooting at the nodes of its decumbent flower stems, means that its control is a continuous task. Portuguese legislation

puts *E. erecta*, together with *E. calycina* Sm., on the list of species introduced in mainland Portugal, considered as invasive according to the Decree Law No. 565/1999, Series I-A of 1999-12-21 that regulates the introduction into nature of non-indigenous species of flora and fauna.

Plant invasions represent the most serious threats in those regions of the world that were under the influence of human colonization (DI CASTRI, 1989). The climatic conditions of the island of Madeira and its high volume of trade in goods and people, make the island highly vulnerable to new introductions. Since 1500 AD, several neophyte were recorded to Madeira and has been well documented over the last one hundred and fifty years by several authors (LOWE, 1831, 1856, 1864; MENEZES, 1894, 1899, 1905, 1914, 1926a, 1926b, 1927; HANSEN, 1968, 1969, 1970, 1971, 1973, 1974, 1978, 1987, 1992) and compiled by VIEIRA (2002). *Ehrharta erecta* is now added to the list of many other introduced *taxa* found on the island of Madeira in the last 12 years (GONÇALVES SILVA *et al.*, 2008, 2009; FERREIRA *et al.*, 2011; BENEDITO & MENEZES DE SEQUEIRA, 2014; PUPO-CORREIA & MENEZES DE SEQUEIRA, 2014; GONÇALVES SILVA & PAZ RÚBEN, 2016; GONÇALVES SILVA & FERREIRA, 2019; CABRAL *et al.*, 2020; FERREIRA *et al.*, 2020) and whose occurrence may negatively affect the structure, functioning and recovery of natural habitats (STINCA & MEI, 2019).

The vector of introduction of *Ehrharta erecta* to the island of Madeira is unknown. As far as we know, the plant is not used as an ornamental plant, in agriculture and has no known ethnobotanical uses. This neophyte was, most likely, accidentally introduced as a soil contaminant in pots of ornamental plants or mixed with seeds of forage plants since we observed it in both gardens and in “abandoned” agricultural terraces.

As stated previously, *E. erecta* has the capability to sustain self-replacing populations without direct human intervention, either by recruitment from seeds or by ramets (tillers, tubers, bulbs, fragments, etc.). Considering the high number of individuals found in the field work carried out in recent years, that will produce, in short time, a high number of fertile offspring at considerable distances from the parent plants, we consider it as another invasive, naturalized species on the Island of Madeira.

By analysing the locations where this species was found or observed *in loco* by the authors on the island of Madeira, it is safe to say that panic veldt grass, like its counterpart *E. longifolia*, occupies an altitudinal range that covers, according to CAPELO *et al.* (2004), the Madeiran Mediterranean secondary grass communities (namely, *Dactylo hylodes-Hyparrhenietum sinaicae*, *Cenchrus ciliaris-Hyparrhenietum sinaicae* and *Bromo-Oryzopsis miliae*). Unless carefully monitored and managed, *E. erecta* Lam. is likely to become invasive in those areas and in the neighbourhood. This in turn could affect, for example, the endemic fish-stunning spurge communities (*Euphorbietum piscatoriae*), leading to the blocking of natural processes of ecological succession (CABRAL *et al.*, 2020).

ACKNOWLEDGEMENTS

The authors wish to thank to Francesca Zino and Manuel Biscoito for language revision and useful comments on a first version of the manuscript. To Pedro Neves for taking the detailed microscope photos.

REFERENCES

- ACEBESGINOVÉS, J. R., M. C. LEÓN ARENCIBIA, M. L. RODRÍGUEZ NAVARRO, M. L., M. del ARCO AGUILAR, A. GARCÍA GALLO, P. L. PÉREZ de PAZ, O. RODRÍGUEZ DELGADO, V. E. MARTÍN OSORIO & W. WILDPRET DE LA TORRE:
2010. Pteridophyta & Spermatophyta. In: *Lista de especies silvestres de Canarias (hongos, plantas y animales terrestres)*. 2009. M. Arechavaleta, S. Rodríguez, N. Zurita & A. García (coord.). Gobierno de Canarias. Pp. 119-172.
- ALMEIDA, J. D.:
2002. *Flora exótica subespontânea de Portugal continental (plantas vasculares)*, 3rd edition – Coimbra.
- BENEDITO, M. & M. MENEZES de SEQUEIRA:
2014. First record of *Cobaea scandens* Cav. (Polemoniaceae) as naturalized plant in Madeira Island (Portugal). *Silva Lusitana*. N.º Especial Floramac 2012. Ano XXII: 131-135.
- CABRAL, L., J. P. FERREIRA, A. BRAZÃO, P. NASCIMENTO & M. MENEZES de SEQUEIRA:
2020. *Ehrharta longiflora* Sm. and *Pennisetum setaceum* (Forssk.) Chiov., two new alien grasses for Madeira Island (Portugal). *Scientia Insularum*, **3**: 133-144.
- CALVO, J. & A. MOREIRA-MUÑOZ:
2018. First record of *Ehrharta longiflora* Sm. (Poaceae, Ehrharteae) for South America. *Check List*, **14** (2): 475-478.
- CAPELO, J., M. MENEZES de SEQUEIRA, R. JARDIM & J. C. COSTA:
2004. Guia da Excursão Geobotânica dos V Encontros Alfa 2004 à Ilha da Madeira. In: Capelo, J. A. *A paisagem vegetal da Ilha da Madeira*. Pp. 5-45. Quercetea, **6**: 3-200.
- CLAYTON, W. D., M. S. VORONTSOVA, K. T. HARMAN & H. WILLIAMSON:
2002. Onwards. World Grass Species – Descriptions, Identification, and Information Retrieval [online]. Available at: <http://www.kew.org/data/grasses-db/www/imp03356.htm> [Accessed 20 May 2020].
- COPE, T. A.:
1994. Poaceae. In: Press, J. R. & Short, M. J. (eds.), *Flora of Madeira*, pp. 406-453. The Natural History Museum. London.
- di CASTRI, F.:
1989. History of biological invasions with special emphasis on the Old World. Pp. 1-30. In: Drake J. A., Mooney, H. A., di Castri, F., Groves, R. H., Kruger, F. J., Rejmánek, M. & Williamson, M. (eds.), *Biological Invasions: A Global Perspective*. John Wiley & Sons, Chichester.
- ERIKSSON, O., A. HANSEN & P. SUNDING:
1979. *Flora of Macaronesia, checklist of vascular plants*. Part I. Revised Edition. 93 pp.
- FERREIRA, M. Z., I. A. FERNÁNDEZ, R. JARDIM & M. M. SEQUEIRA:
2011. *Andryala integrifolia* L. (Asteraceae), a new alien species for the Island of Madeira (Portugal). *Silva Lusitana*, **19** (1): 114-125.
- FERREIRA, J. P., L. CABRAL, A. BRAZÃO, P. NASCIMENTO & M. MENEZES de SEQUEIRA:
2020. Two new alien fern taxa for Madeira Island (Portugal). *Scientia Insularum*, **3**: 145-153.
- GARCIA, J. G.:
1946. Algumas novidades para a flora ibérica. *Anales del Jardín Botánico de Madrid*, **6**: 421-438.
- GLUESENKAMP, D.:
2004. ACR's Bolinas Lagoon Preserve as a test area for

- regional conservation: Eliminating *Ehrharta*. *The Arceid: Research and Resource Management at Audubon Canyon Ranch*: 6-9.
- GONÇALVES SILVA, J. J., J. C. SEMPLE, R. LOPEZ LAPHITZ & M. MENEZES de SEQUEIRA:
2008. First record of La Plate River Goldenrod *Solidago chilensis* Meyen (Asteraceae), in the Island of Madeira (Portugal). *Boletim do Museu Municipal do Funchal*, **58** (320): 31-36.
- GONÇALVES SILVA, J. J., R. BARONE & M. MENEZES de SEQUEIRA:
2009. First record of naturalized *Viburnum tinus* L. (Caprifoliaceae), in the Island of Madeira (Portugal). *Boletim do Museu Municipal do Funchal*, **59** (323): 5-15.
- GONÇALVES SILVA, J. J. & F. PAZ RÚBEN:
2016. First record of the White Champion *Silene latifolia* Poir. subsp. *latifolia* (Caryophyllaceae), in the Island of Madeira (Portugal). *Boletim do Museu de História Natural do Funchal*, **66** (343): 13-17.
- GONÇALVES SILVA, J. J. & J. P. FERREIRA:
2019. First record of the Rose Evening Primrose *Oenothera rosea* L' Hér. ex Aiton (Onagraceae) on the island of Madeira (Portugal). *Boletim do Museu de História Natural do Funchal*, **69** (355): 33-38.
- HANSEN, A.:
1968. Floristische beobachtungen auf der insel Madeira (nebst biographischen notizen über einige ältere sammler von Madeira – Pflanzen). *Bocagiana*, **15**: 1-11.
1969. Weitere beiträge zur flora der insel Madeira. *Bocagiana*, **19**: 1-11.
1970. Beiträge zur Flora der Inseln Madeira, Porto Santo und Ilhéu Chão (Desertas). *Bocagiana*, **25**: 1-18.
1971. Contributions to the flora of the Madeira Archipelago. *Bocagiana*, **27**: 1-14.
1973. Contributions to the flora of Madeira. *Bocagiana*, **32**: 1-13.
1974. Contributions to the flora of Madeira and Porto Santo. *Bocagiana*, **36**: 1-37.
1978. Contributions to the flora of the Archipelago of Madeira. *Bocagiana*, **45**: 1-18.
1987. Contributions to the flora of the Archipelago of Madeira. *Bocagiana*, **109**: 1-11.
1992. Contributions to the flora of the Azores, Madeira, P. Santo and the Canary Islands. *Boletim do Museu Municipal do Funchal*, **44** (242): 157-179.
- HANSEN, A. & P. SUNDING:
1993. Flora of Macaronesia. Checklist of vascular plants. 4th revised edition, *Sommerfeltia*, **17**: 295 pp.
- JARDIM, R. & M. M. SEQUEIRA:
2008. As plantas vasculares (Pteridophyta e Spermatophyta) dos arquipélagos da Madeira e das Selvagens. In: Borges, P. A. V., Abreu, C., Aguiar, A. M. F., Carvalho, P., Jardim, R., Melo, I., Oliveira, P., Sérgio, C., Serrano, A. R. M. & Vieira, P. (eds.), *Listagem dos fungos flora e fauna terrestre dos arquipélagos da Madeira e Selvagens*, pp. 157-208. Direcção Regional do Ambiente da Madeira and Universidade dos Açores. Funchal and Angra do Heroísmo.
- KELLOGG, E. A.:
2015. The Flowering Plants Monocots: Poaceae. In: Kubitzki, K. (ed.) *The Families and Genera of Vascular Plants*, vol. 13, Springer International Publishing, Switzerland, 145-146 pp.
- KUNKEL, G.:
1978. An Excursion through my herbarium-II. *Vieraea*, **8**: 337-364.
- LOWE, R. T.:
1831. Primitiae Faunae et Florae Maderae et Portus Sancti; sive species quaedam novae vel hactenus minus rite cognitae animalium et plantarum in his insulis degentium breviter descriptae. *Transactions of the Cambridge Philosophical Society*. **4** (1): 1-70.
1856. Species Plantarum Maderensium quaedam Novae, vel hactenus ineditae, breviter descriptae. *Hooker's Journal of Botany and Kew Garden Miscellany*. **8**: 289-302.
1864. *A manual Flora of Madeira and the adjacent Islands of Porto Santo and the Desertas*. Vol. **1**. Part: III: 275-276. London.
- McINTYRE, S. & P. Y. LADIGES:
1985. Aspects of the biology of *Ehrharta erecta* Lam. *Weed Research*, **25** (1): 21-32.
- MENEZES, C. A.:
1894. *Catálogo das Phanerogamicas da Madeira e do Porto Santo não indicadas na Flora d'estas ilhas, do Revd.º Padre Richard Thomas Lowe*. Typ. do "Direito do Funchal". Funchal. 69 pp.
1899. *Notice sur Les Phanérogames de Madère et Porto Santo non indiquées dans la flore de ces îles de Richard Thomas Lowe*. Imprimerie "Academica". Funchal. 23 pp.
1905. *Catálogo das Phanerogamicas e Cryptogamicas Vasculares do Archipelago da Madeira (Madeira, Porto Santo e Desertas)*. *Annaes de Sciencias Naturaes*. **9**: 119-144.
1914. *Flora do Archipelago da Madeira (Phanerogamicas e Cryptogamicas Vasculares)*. Typ. Bazar do Povo. Funchal. 282 pp.
1926a. Novos subsídios para o estudo da flora do Arquipélago da Madeira. *Brotéria. Série de Botânica*. **22** (1): 20-27.
1926b. Nota acerca de algumas plantas da flora do Arquipélago da Madeira. *Jornal de Ciências Matemáticas, Físicas e Naturais*. **96**: 1-7.
1927. Mais algumas notas sobre a Flora Madeirense. *Brotéria. Série de Botânica*. **23** (2): 73-77.

- MENEZES de SEQUEIRA, M., D. ESPÍRITO-SANTO, C. AGUIAR, J. CAPELO & J. HONRADO:
2011. *Checklist da Flora de Portugal (Continental, Açores e Madeira)*. Associação Lusitana de Fitossociologia. Lisboa, p. 33.
- OGLE, C.:
1988. Veld grass (*Ehrharta erecta*) has come to stay. *Bulletin Wellington Botanical Society*, **44**: 8-15.
- PALHINHA, R. T.:
1966. *Catálogo das plantas vasculares dos Açores*. Edição da Sociedade de Estudos Açoreanos Afonso Chaves, Lisboa, Portugal, 186 pp.
- POWO:
2019. Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew [online]. Available at: <http://www.plantsoftheworldonline.org/taxon/urn:lsid:ipni.org:names:17988-1> [Accessed 21 May 2020].
- PUPO-CORREIA, A. & M. MENEZES de SEQUEIRA:
2014. *Billardiera heterophylla* (Lindl.) L. Cayzer & Crisp (Pittosporaceae) as naturalized plant in Madeira Island (Portugal). *Silva Lusitana*. N.º Especial Floramac 2012. Ano XXII: 27-33.
- PYŠEK, P., D. M. RICHARDSON, M. REJMÁNEK, G. L. WEBSTER, M. WILLIAMSON & J. KIRSCHNER:
2004. Alien plants in checklists and floras: towards better communication between taxonomists and ecologists. *Taxon*, **1** (53) 131-143.
- QUINTAL, R.:
2007. *Quintas, Parques e Jardins do Funchal – Estudo Fitogeográfico*, pp. 615-665. Esfera do Caos Editores Lda. Lisboa.
- RAY, C. A., J. J. SHERMAN, A. L. GODINHO, N. HANSON & I. M. PARKER:
2018. Impacts and Best Management Practices for Erect Veldtgrass (*Ehrharta erecta*). *Invasive Plant Science and Management*, **11**: 40-48.
- SÁNCHEZ-PINTO, L., M. L. RODRÍGUEZ, S. RODRÍGUEZ, K. MARTÍN, A. CABRERA & M. C. MARRERO:
2005. Spermatophyta. In: Arechavaleta M., Zurita, N., Marrero, M. C. & Martín, J. L. (eds.), *Lista preliminar de especies silvestres de Cabo Verde (hongos, plantas y animales terrestres)*. Consejería de Medio Ambiente y Ordenación Territorial, Gobierno de Canarias, pp. 40-57.
- SCHÄFER, H.:
2005. *Flora of the Azores, a field guide*. 2nd enlarged edition. Margraf Publishers. Weikersheim, Germany. 346 pp.
- SILVA, L., M. MOURA, H. SCHAEFER, F. RUMSEY & E. F. DIAS:
2010. List of vascular plants (Tracheobionta) In: Borges, P. A. V., Costa, A., Cunha, R., Gabriel, R., Gonçalves, V., Martins, A. F., Melo, I., Parente, M., Raposeiro, P., Rodrigues, P., Santos, R. S., Silva, L., Vieira, P. & Vieira, V. (eds.) *A list of the terrestrial and marine biota from the Azores*. pp. 117-146, Príncipe, Cascais, 432 pp.
- SMITH Jr. & P. JAMES:
2012a. *Ehrharta*, in Jepson Flora Project (eds.) *Jepson eFlora* [online]. Available at: https://ucjeps.berkeley.edu/eflora/eflora_display.php?tid=11048 [Accessed 1 September 2020].
2012b. *Ehrharta erecta*, in Jepson Flora Project (eds.) *Jepson eFlora* [online]. Available at: https://ucjeps.berkeley.edu/eflora/eflora_display.php?tid=23854 [Accessed 1 September 2020].
- STINCA, A. & G. MEI:
2019. *Ehrharta erecta* Lam. (Poaceae, Ehrhartoideae): distribution in Italy and taxonomy of one of the most invasive plant species in the world. *BioInvasions Records*, **8** (4): 742–752.
- VALDÉS, B. & H. SCHOLZ:
2009. *Poaceae* (pro parte majore). Euro+Med Plantbase Project (bgbm.org) – the information resource for Euro-Mediterranean plant diversity [online]. Available at: <http://ww2.bgbm.org/EuroPlusMed/PTaxonDetail.asp?NameCache=Ehrharta&PTRefFk=7100000> [Accessed 16 September 2020].
- VERLOOVE, F. & E. S. GULLÓN:
2012. New records of interesting vascular plants (mainly xenophytes) in the Iberian Peninsula. II – *Flora Mediterranea*, **22**: 5-24.
- VIEIRA, R.:
2002. Flora da Madeira. Plantas vasculares naturalizadas no arquipélago da Madeira. *Boletim do Museu Municipal do Funchal (História Natural)*, Supl. n.º **8**: 5-281.